

Remarks

Initially, Applicants again gratefully acknowledge the indication of allowability of claims 6, 13 & 20 if rewritten into independent form including all the limitations of the base claim and any intervening claims. Presently, these dependent claims have not been rewritten into independent form since the independent claims from which they ultimately depend are believed to be in condition for allowance for the reasons set forth below. Claims 1-20 remain pending herein.

In the Office Action, claims 1-3, 7-10 & 14-17 were rejected under 35 U.S.C. §102(e) as being anticipated by Deierling (U.S. Patent No. 6,239,847; hereinafter Deierling), while claims 4, 5, 11, 12, 18 & 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Deierling in view of Wu et al. (U.S. Patent No. 5,959,693; hereinafter Wu). These rejections are respectfully, but most strenuously, traversed and reconsideration thereof is requested.

Applicants request reconsideration and withdrawal of the anticipation rejection and the obviousness rejection on the following grounds: (1) the final Office Action has misinterpreted the teachings of the Deierling patent, and has misinterpreted the teachings of the Wu patent, thus voiding the basis for the rejections; (2) the documents themselves individually, and in combination, lack any teaching, suggestion or incentive for their further modification as necessary to achieve Applicants' recited invention; and (3) to the extent characterized in the final Office Action, the citations of Deierling and Wu individually, and in combination, are a hindsight reconstruction of the claimed invention using Applicants' own disclosed subject matter.

Applicants' invention, in one aspect, is directed to a method of filtering pixels of video frames of a sequence of video frames for facilitating video encoding thereof (see claim 1). This method includes:

prior to MPEG compressing encoding the video frames, obtaining pixel values of the video frames of the sequence of video frames; and

programmably vertically filtering noise from the pixel values of the video frames prior to the MPEG compression encoding thereof.

Applicants respectfully submit that numerous aspects of their above-summarized invention are not taught or suggested by Deierling (or Wu), and therefore request reconsideration and withdrawal of the rejections based thereon.

FIG. 6 of the present application depicts one embodiment of a vertical filter 540 in accordance with an aspect of the invention. As shown, vertical filter 540 includes a vertical filter buffer 610 and a vertical filter logic 620. Vertical filter buffer (VFB) 610 rearranges and temporarily holds the input pixel data until there is enough data for the vertical filter logic to process. Since input pixel data is received in horizontal order, the VFB buffers multiple pixel lines until the buffer can supply enough data for all input taps of the vertical filter employed. As used in the application, a tap refers to a pixel data of a particular line. Thus, a four-tap filter requires four vertically disposed pixels, while a five-tap filter requires five vertically disposed pixels. Output from VFB 610 are luminance components (LUM) and chrominance components (CHR) of the pixel values to be filtered by the vertical filter logic. (See [0049] of the specification.)

As is clear from Applicants' specification, the term "vertical noise filter" (or "vertically filtering noise") refers to a specific type of noise filter as disclosed by Applicants. In particular, a vertical noise filter requires rearrangement of input pixel data so that data can be processed vertically, rather than horizontally, as is the conventional approach. By processing data vertically, additional noise components are removed from the input pixel data than can be achieved by horizontal noise filtering alone. A careful reading of both Deierling and Wu fails to uncover any teaching or suggestion that the noise filters disclosed therein comprise vertical noise filters as recited by Applicants.

Deierling discloses a two-pass multi-dimensional data scaling arrangement and method which includes a noise reduction component as an associated task to the invention disclosed therein (see block 502 of Fig. 6 of Deierling). As described as column 7, lines 15-30 of Deierling, the digital video image received from digital camera 501 is passed to a programmable digital signal processor 502 which performs timing record and clipping, noise reduction, horizontal multi-phase scaling, storage to memory 503, and vertical multi-phase scaling. As taught by Deierling, noise reduction precedes horizontal scaling, which is performed in a pixel-by-pixel basis as data is written into memory block 503. Data is then read back out of the

memory to allow vertical scaling, and the horizontally and vertically scaled pixels are then output from the system to an external D-A video encoder 504 to generate a video signal.

Initially, Applicants respectfully submit that Deierling fails to teach or suggest any vertical noise filtering *per se*. In accordance with Deierling, noise reduction precedes the horizontal scaling meaning that the pixels must be in a horizontal raster form as they are passing through the noise reduction filter. Thus, Deierling is describing horizontal noise reduction, not vertical noise reduction. Further, the horizontal scaling and vertical scaling logic described in Deierling does not equate to a vertical noise filter as recited by Applicants. Noise reduction and scaling are understood by those skilled in the art as being distinct functions, as represented by Deierling itself, wherein the noise reduction function is separated from the scaling blocks. For at least this reason, Applicants respectfully submit that the final Office Action misinterprets the teachings of Deierling when applying those teachings to their claimed invention.

Further, the scaling operation arrangement of Fig. 2 in Deierling is simply not applicable to the vertical noise filtering recited by Applicants. A scaling filter refers to a change in picture or frame size, and does not equate to noise filtering, let alone to a vertical noise filtering as recited by Applicants. For at least this additional reason, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection to their independent claims based upon the teachings of Deierling.

Additionally, Applicants recite a programmable noise filter in their independent claims, and more particularly, recite programmably vertically filtering noise from pixel values of the video frames. Applicants respectfully submit that the final Office Action fails state a *prima facie* case of anticipation against the subject matter recited in the present application. The final Office Action merely repeats Applicants' recited claim language, without explanation as to how Deierling teaches a vertical and programmable noise filter as recited by Applicants. The scaling filter 210 of Fig. 2 of Deierling is merely that, a scaling filter, and does not teach or suggest a noise filter to one of ordinary skill in the art. A scaling filter is presented to change picture or frame sizes, not to reduce noise. For this additional reason, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection to the independent claims based upon the teachings of Deierling.

Still further, Applicants recite in their independent claims that the programmable vertical filtering of noise from the pixel values occurs prior to MPEG compression encoding. A careful reading of Deierling fails to uncover any teaching or suggestion that the scaling and noise reduction described therein occur prior to MPEG compression encoding. The encoder 504 in Fig. 6 of Deierling is referred to as a digital-to-analog NTSC video encoder, which is not truly compression encoding, let alone an MPEG compression encoding as recited by Applicants. For this additional reason, Applicants respectfully submit that there is no teaching or suggestion of their claimed invention in Deierling, and reconsideration and withdrawal of the anticipation rejection based thereon is requested.

Further, upon a careful review of Deierling (and the Wu patent), there is no teaching, suggestion or incentive for further modification of thereof as would be necessary to achieve Applicants' invention. In this regard, neither Deierling or Wu teaches a vertical noise filter, let alone a programmable vertical noise filter as recited by Applicants.

Yet further, the characterizations of the teachings of Deierling provided in the final Office Action set forth no technical basis outside that contained in Applicants' own specification for the functionality at issue. The characterizations of the teachings of Deierling in particular merely assert the language of Applicants' claimed invention in hindsight without explaining how the provision of programmably vertically filtering noise from pixel values of video frames prior to MPEG compression encoding thereof as defined in Applicants' independent claims would have been anticipated by (or even obvious) based upon the teachings of the Deierling patent. Thus, the rejection violates the well known principle that Applicants' own disclosure cannot be used as a reference against them.

In summary, Applicants traverse the rejection to the independent claims based upon the misinterpretation of the Deierling patent; the lack of an actual teaching, suggestion or incentive in the art for the modifications necessary to achieve their invention; and the use of Applicants' own disclosure and results as a basis for the alleged modification/misinterpretation.

There is no discussion in Deierling of vertically filtering noise per se, let alone of programmably vertically filtering noise from pixel values of video frames prior to MPEG compression encoding thereof, as recited by Applicants.

For all the above reasons, Applicants respectfully submit that the independent claims patentably distinguish over the teachings Deierling. Reconsideration and withdrawal of the anticipation rejection based thereon is therefore respectfully requested.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations. For example, Applicants recite in claims 2, 9 & 16 that the programmably vertically filtering noise includes obtaining vertical filter coefficients for use in vertically filtering the pixel values. In rejecting this subject matter, the final Office Action references Figure 2 of Sita et al., which is believed to be a clerical error and is understood to cite Fig. 2 of Deierling, since these claims are rejected as being anticipated by Deierling. If this is incorrect, clarification is requested.

As noted above, Fig. 2 of Deierling is a block diagram of an arrangement for performing a scaling operation. As understood by one skilled in the art, a scaling operation refers to a reformatting of the size of the video frames, and not to noise filtering. Thus, Applicants respectfully submit that the final Office Action misinterprets the teachings of Deierling as somehow being applicable to the dependent claims at issue. There is simply no vertical noise filtering described in Deierling, let alone a programmably vertically filtering of noise from pixel values. As clearly indicated in Fig. 2 of Deierling, horizontal scaling and vertical scaling are depicted and described. Noise filtering is only described in Deierling with reference to Fig. 6 thereof, and in this connection, there is no discussion that a vertical noise filtering approach is presented, let alone a programmable vertical noise filter, as recited by Applicants.

The obtaining of vertical filter coefficients is further characterized by Applicants in dependent claims 3, 10 & 17 as including dynamically obtaining via a host interface new filter coefficients during the programmably vertically filtering of pixel values. Thus, in accordance with Applicants' invention, there is a dynamic substitution of vertical filter coefficients for the vertical noise filter during the vertical filtering of pixel values using prior coefficients. No similar teaching or suggestion can be found in Deierling at all, and in particular, in the citations to the scaling operations of Fig. 2 and the encoder of Fig. 3 thereof. Further, the final Office Action provides no guidance as to how one of ordinary skill in the art would have been lead by the teachings of Deierling to the recited functionality at issue.

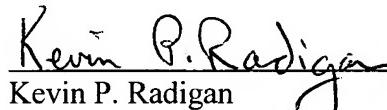
Still further, dependent claims 7 & 14 recite that the vertical filter coefficients are dynamically programmable per video frame of the sequence of video frames. Again, the final Office Action fails to address this aspect of Applicants' recited invention. The vertical filter coefficients employed in Applicants' recited invention are used in a vertical noise filter, and in particular, in a programmable vertical noise filter. A careful reading of Deierling fails to uncover any discussion or a suggestion of a vertical noise filter, let alone a programmable one wherein filter coefficients can be dynamically programmed on a per frame basis. Thus, reconsideration and withdrawal of the anticipation rejection to these claims is also requested.

Dependent claims 4, 5, 11, 12, 18 & 19 stand rejected as being obvious over Deierling in view of Wu. This rejection is also respectfully traversed and reconsideration is requested.

Without acquiescing to the characterizations of Wu stated in the final Office Action relative to these dependent claims, Applicants note that the rejection is believed erroneous based on the misinterpretation of Deierling noted above. Therefore, reconsideration and withdrawal of the rejection to these claims is also respectfully requested.

For all the above reasons, Applicants respectfully request reconsideration and withdrawal of the final Office Action, and allowance of all claims presented herewith. Should the Examiner desire to conference, Applicants' undersigned attorney is available to discuss this application further with the Examiner by telephone at the number provided.

Respectfully submitted,



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